BOOK OF ABSTRACTS

SEVENTH FRAMEWORK PROGRAMME

CLAMER
CLIMATE CHANGE & EUROPEAN MARINE ECOSYSTEM RESEARCH

International CLAMER Conference

LIVING WITH A WARMING OCEAN:

European Research and Public Perception of Climate Change Impacts in the Marine Environment

VLIZ SPECIAL PUBLICATION 52

VLIZ

Royal Flemish Academy of Belgium for Science and the Arts, Brussels
15 September 2011

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LIVING WITH A WARMING OCEAN

European Research and Public Perception of Climate Change Impacts in the Marine Environment

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CLAMER conference:

'Living with a warming ocean: European Research and Public Perception of Climate Change Impacts in the Marine Environment'

The CLAMER EU-FP7 project (www.clamer.eu) compiles scientific and public knowledge on the effects of climate change on the European seas and oceans. The conference will present key findings of the CLAMER project, including the results of a pan-European public poll on perception and awareness. In addition, the CLAMER documentary film, 'Living with a warming ocean' will be premiered at the pre-event of the conference.

The CLAMER conference is organised as a contact forum of The Royal Flemish Academy of Belgium for Science and the Arts.

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PREFACE BY THE PROJECT COORDINATORS

Climate change has become a household word in Europe, but its consequences for the day-to-day life of European citizens are not yet fully appreciated, let alone are people changing their behaviour in anticipation of what is coming. At the political level, the EU and its member states have been actively engaged in developing EU policies and in negotiating the climate conventions at the global scale, but with limited success as the outcome of the Copenhagen Climate Conference in 2009 has shown. One of the reasons for the apparent knowledge gap and the consequent public and political ignorance, indifference or even hostility in many countries worldwide, is that climate change operates slowly and erratically, at time scales that are very different from the economic and political reality, and from the perception of the public. Trends rather than events are what matter, but one cold winter in a particular country is enough to create doubt about the reality of climate change.

The public and political debate on climate change heavily relies on science. This puts an immense responsibility on scientists and requires impartial, objective and excellent science. Things have not become easier since the scientific credibility of the Intergovernmental Panel on Climate Change has been undermined in the popular press. So-called Climate Sceptics, sometimes scientists themselves, are given the floor in the public debate by the media, creating confusion of the scientific point of view that climate change is a reality, a view that is upheld by a very large majority of serious scientists and by nearly all the specialists in the field. The debate on climate change therefore still needs input from science as one of the essential elements.

The possible consequences of climate change are immense and require information and debate by the general public. This holds especially for the impacts of climate change on the marine environment. Despite the fact that the seas and oceans around Europe are vast and diverse, and form an important part of the European territory, most people only experience the beaches and, at best, have a theoretical knowledge about the fact that the climate and weather patterns in Europe are dominated by what happens in the ocean. Even sea-level rise, as one of the most dramatic direct consequences of climate change for some countries, occurs too slowly to really frighten people even in the most affected countries, such as the Netherlands.

But the oceans are changing, and in some cases changing far more rapidly than we thought was possible only a decade ago. The rapidly and ever increasing CO_2 concentrations in the atmosphere have warmed up at least the upper 2 km of the oceans. Subtle consequences of that are increased stratification, leading to diminishing productivity, and a slow but steady loss of oxygen from deeper waters, with devastating effects on the deeper water biota. The acidity of the oceans is increasing with consequences that are still largely unknown. Species are changing their distributions, in general moving northward everywhere, from the North Sea to the Barents Sea, from the Mediterranean to the Black Sea and so on. Fishermen, seals and birds alike will have to follow their favourite catches.

Within the CLAMER project, a group of distinguished marine scientists was invited to summarise the state of knowledge on the issue, especially as based on the results of EU funded research. The EU has been an important international sponsor of climate research with its framework programmes, and the European marine science community, in particular, has contributed significantly to new knowledge and the discussion on climate change alike. But also in Europe, communication of these results to policymakers and to the general public can be improved. Only when the facts are known, can the implications be studied. And only with public support, can the necessary policies be designed and implemented.

Carlo Heip
Katja Philippart

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ICELAND – A LAND OF FIRE, ICE AND CLIMATE CHANGE

Catharina Johanna Maria Philippart

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Climate change is a global phenomenon that affects local marine ecosystems via a cascading range of physical, chemical and biological processes acting at different scales. Although Iceland is a relatively small island in the midst of a large ocean and one of the world's smallest polluters, it is highly affected by the consequences of climate change such as illustrated by a rise in temperatures, shifts in fish stocks and declines in recruitment success of seabirds. These local environmental changes may be backfiring to the mainland. Last year, for example, the ash cloud produced by the volcano under the glacier Eyjafjallajökull forced a temporary closure of north-western European airspace. The supply of the iron-rich volcanic ash to the Atlantic Ocean may also have lengthened the spring bloom of phytoplankton in the sub-polar regions of the North Atlantic. Such interactions between events at one location such as Iceland and the rest of the world indicate that climate change science requires the dominant processes across all scales in time and space to be identified in order to further understand and predict the inevitable impacts of climate change on our environment and to develop truly integrated and complete adaptation responses.

THE CLAMER FILM: 'LIVING WITH A WARMING OCEAN'

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As a director and producer of documentary films for international television for over 20 years, I must tell that the making of the film 'Living with a Warming Ocean' on behalf of the European project CLAMER was a new kind of intellectual challenge for me. Based on a first reading, the title of the film project as written in the call for tender looked a bit technical. It was called: 'Production of a film on climate change in European marine waters and its socioeconomic consequences, including documentation of public knowledge on the issue'. Moreover, it was asked to create a film written as a documentary for the general public. At first glance, the task was not looking particularly easy! My interest quickly focused on this 'public knowledge' approach, where I felt a possibility to write a film that could interest the general public. Though there are many existing documentaries on climate change, I did not know any approaching the topic from the aspect of public awareness and consciousness. By writing the film from the public side of view, it would be possible to connect with another innovative aspect: the communication between science and the public, another topic that is not really known to the public.

Filming in seven European countries, from Greece to northern Germany via Italy, France, Belgium, the Netherlands and the UK, earned me a warm welcome from the public as well as from scientists, demonstrating that the climate change phenomenon inspires Europe, at all levels of society. Because of a tight schedule, I had to film all the sequences before the answers of the poll on public awareness related to climate change conducted by TNS in nine European countries on behalf of the CLAMER project. I must recognise that I was a little bit afraid that some of the sequences of the film could be in contradiction to the reliability of the poll results. But this did not happen: the most surprising match for me being the reaction of Dutch people against the rise of ocean waters. Technically speaking, when one writes a documentary film, one is faced with two general writing approaches what we call the conceptual and the factual aspects. Conceptual aspect is the expression of intellectual ideas, of theories, to be integrated in the film, which are expressed in the narration itself, or by means of interviews, and our job as director is to do our best to illustrate these concepts not to be boring. For the general public, the conceptual aspect of a film is always the more difficult to manage. On the other hand, we have what we call the 'factual' sequences in which you show actual human experiences, linked with the film subject. In our case, it may be, for example the filming of fishermen and scientists facing the tropicalization of the Mediterranean Sea. The general public is much more easily interested in these factual sequences, but if we put too many of them in a film, we can easily loose the theoretical basis behind the movie. So we could say that, like in many areas dealing with the environment, the success of a project is due in large part to our ability to establish a subtle balance between different forces that apparently oppose themselves.

CONFERENCE – 15 SEPTEMBER 2011

Conference chair: Quentin Cooper

SESSION 1

European marine climate change research in a global perspective

OVERVIEW OF EUROPEAN RESEARCH ON CLIMATE AND MARINE ENVIRONMENT

Manuela Soares

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European climate research addresses key questions on the functioning of the Earth-system, the human interference, its impacts and consequences. It aims to quantify not only global but also local impacts of climate change in the most sensitive regions of Europe and worldwide, and it supports further policy options. Moreover, research on climate change promotes technological improvement, innovative management practises (e.g. adaptation and mitigation strategies), new business models and services, and behavioural changes.

Internationally, the considerable research outcomes of the varied range of European funded projects in the climate change area have contributed substantially to the IPCC activities, and they are expected to feed as well into the current preparation of the 5th Assessment Report.

Since Framework Programme 5 and during Framework Programmes 6 and 7, the European Commission has been leading international efforts to investigate major processes of climate change and its impacts on our marine ecosystems. Research has been conducted in all European geographical areas, from the North Atlantic to the Mediterranean, and by an integrated approach that includes observation, monitoring, modelling, and management.

All relevant results and outcomes collected in more than 10 years of EU-funded research in this field constitute a remarkable patrimony of knowledge, upon which future activities can be planned and policy actions can be strengthened.

The European Commission is committed to continue its support to research and innovation, and ultimately to EU´s ambitious policy objectives, through the Horizon 2020 Framework, which will start in 2013.

As underlined in the Green Paper issuing the Horizon 2020 Framework, the objectives are to raise the excellence and the innovation of the research base, to boost competitiveness, and to tackle grand societal challenges, such as climate change and resource efficiency.

Within this long-term agenda, research on marine environment, and specifically on impacts by climate change on marine ecosystems, will continue to play a prominent role, always favouring the dialogue among researchers, policy makers and European citizens.

CLIMATE CHANGE IMPACTS ON MARINE ECOSYSTEMS IN EUROPE

Carlo Heip*, Manuel Barange, Roberto Danovaro, Marion Gehlen, Anthony Grehan, Filip Meysman, Temel Oguz, Vangelis Papathanassiou, Katja Philippart, Jun She , Paul Tréguer, Rachel Warren, Paul Wassmann, Phil Weaver, Rita Yu, Justus van Beusekom, Philip Boyd, Andrew Cooper, Hein J.W. de Baar, Henk de Haas, Felix Janssen, Wolfgang Ludwig, Leif Toudal Pedersen, Michael Tsimplis, Hans Von Storch, Jan - Bart Calewaert and Niall McDonough

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The marine environment of Europe is vast and extremely diverse. Europe is bordered by the Atlantic Ocean to the west, the Arctic Ocean to the north and the Mediterranean to the south. Europe has the largest coastline relative to its surface of all continents and its economy is highly dependent on the seas and oceans in sectors such as tourism, transport, fisheries, energy, and many more. Changing marine ecosystems has direct consequences for human society.

Climate change affects the oceans. The rapidly and steadily increasing CO_2 concentrations in the atmosphere have warmed up at least the upper 2km of the oceans. The subtle consequences of that are increased stratification, leading to diminishing productivity, and increased hypoxia in the deeper waters, leading to the oceans losing oxygen slowly but steadily, with devastating effects on the deeper water biota. The pH of the oceans is decreasing with still largely unknown consequences. In response to warming waters, species are changing their distributions, in general moving northward everywhere, from the North Sea to the Barents Sea, from the Med to the Black Sea and so on. Fishermen, seals and birds alike will have to follow the movements of their prey.

As the oceans are changing, also the human environment on land is affected. Increasing water temperatures change the atmospheric circulation and affect weather patterns on land. Melting of land ice and thermal expansion are raising sea-levels, threatening coastal habitats as the rate of melting and sea-level rise is increasing. Melting of sea ice in the Arctic Ocean in summer is changing the food web and allows free transfer from the Pacific to the Atlantic and vice versa, for microorganisms and commercial vessels alike.

All these changes have been observed and much evidence is accumulating to scientifically support the conclusion that climate change is impacting our marine ecosystems as much as ecosystems on land. But observations from the oceans and seas are scattered and few sustained data series exist except for a few parameters. Even for temperature and salinity frequent systematic observation on a large scale is less than ten years old. A number of scientific unknowns remain and changes in vast areas in the deeper waters especially are a black knowledge hole. To come to grips with the high variability in many data in order to extract trends more reliably and support policies more adequately much better and more systematic observation is required.

IPCC, CLIMATE CHANGE RESEARCH AND THE MARINE ENVIRONMENT

Jean-Pascal van Ypersele

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Climate change due to human activities is happening now. The massive combustion of fossil fuels since the industrial revolution increased the atmospheric concentration of carbon dioxide, the main anthropogenic greenhouse gas, by 40% between 1750 and 2010. The additional infrared heat trapping due to this change in atmospheric composition will continue to increase the average global surface air temperature and modify the Earth's climate. In its fourth Assessment Report (AR4, 2007), the Intergovernmental Panel on Climate Change (IPCC) Working Group I reports that in the absence of climate protection policies, continued emissions are likely to increase this global temperature by 1.6 to 6.9°C between the pre-industrial period and 2100, depending on which scenario and model is used. Such rates of global climate change are rapid and very unusual in the context of changes over the past two million years. Through thermal expansion and the melting of glaciers and ice sheets, this warming is causing sea level to increase, and ocean currents and even the thermohaline circulation will be influenced. The hydrological cycle will also be affected, with, e.g., significant drying of the average Mediterranean basin. Besides changes in the average climate, the probability of occurrence of heat waves (virtually certain), heavy precipitation events (very likely), intense tropical cyclones (likely), and extreme high sea level (likely) is due to increase in a warming climate.

IPCC Working Group II assessed the impacts that would accompany such warming. Some of them are specific to the oceans: e.g., coral bleaching would increase, and coastal regions would be subjected to increased damage from flood and storms. Ocean acidification due to the increased carbon dioxide flow to the oceans risks to further affect marine life.

The oceans will receive particular attention in the fifth Assessment Report (AR5) of the IPCC. For the first time, a specific chapter will be devoted to 'Open Oceans' in the Working Group II contribution.

This talk will review those elements, and explain the role of the IPCC in assessing them so that all decision-makers have the best policy-relevant (but not policy-prescriptive) information at their disposal. Research on the marine environment will be key to provide improved knowledge to be assessed by IPCC.

SESSION 2

The European public and its perception/ awareness of climate change impact

THE OUTCOMES OF THE FIRST PAN-EUROPEAN POLL ON PUBLIC PERCEPTION AND AWARENESS OF CLIMATE CHANGE IMPACTS ON THE MARINE ENVIRONMENT

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Gathering information on marine environmental issues that the public knows and cares about is critical for the EU, both to help improve the way it communicates science to European citizens and to enhance its standing as a trusted source of knowledge.

Here we report on the EU-funded CLAMER public poll, the first of its kind to focus on the marine environment and climate change impacts. To get as broad a perspective as possible we cast the net widely, polling 10,000 people across 10 different countries, with coastlines spanning from the Arctic to the Mediterranean.

The CLAMER survey shows that the public still clearly cares about climate change, ranking it second overall from a list of major global issues (only poverty scored higher) and almost everybody we polled believes that climate change is at least partly caused by humans.

Interestingly, the survey results show that the marine issues the public are most concerned about are not directly related to climate change (pollution, over-fishing and habitat destruction), although a range of climate change issues (sea level and flooding, melting sea-ice, erosion and extreme weather) all score very highly. Of these issues, changes in extreme events are of the most immediate concern with over 50% of people saying that this is already happening as a result of climate change.

The public appear to have a remarkably good understanding about the rate of sea level and temperature change, both over the past and coming century. This suggests some fundamental messages are getting through to the public. However for some issues, most notably ocean acidification, public awareness is extremely low. More effort needs to be made to highlight these issues using the most popular forms of media, TV and the internet. Ideally scientists, who have the highest levels of public trust, should be used to help communicate messages.

Looking at marine climate change research themes that the EU should prioritise, there is a clear link between awareness and priorities, with melting sea ice coming out on top. However, some issues such as impacts on disease and pests and coastal communities are seen as being a high priority, despite limited awareness of these issues.

When the results are compared at a country level, or according to age and gender, there are some clear differences in opinions. For example, the EU is regarded as being ‘effective on tackling climate change’ by twice as many people in some countries than others, whilst females and older people are most ‘concerned’ about all of the issues raised. The EU needs to recognise these differences if it is to formulate effective communication strategies in the future.

EXPLORING PUBLIC UNDERSTANDING OF, AND RESPONSES TO, MARINE CLIMATE CHANGE

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Background
In industrialised countries, responding to the challenge of climate change requires changes to economies, societies and individual lifestyles, and many people find this daunting or unacceptable. Nevertheless, it is vital that the public engages with efforts to both curb and adapt to climate change, for instance by taking an active role in public debates, backing climate protection policies, changing their own habits and routines and, where relevant, taking protective measures. So it is important to understand the public's knowledge, views and attitudes on these issues and the factors that underlie them.

Public perceptions
A recent in-depth study of public understanding of these issues carried out for CLAMER indicates that many members of the public tend to prioritise environmental problems that they themselves have experienced or seen, which helps to explain why pollution emerged as the most important marine environmental issue for the public according to the CLAMER survey. As for marine climate change impacts more specifically, sea level rise, coastal flooding and erosion are regarded as important because they affect human populations on land and in some instances their effects are already visible. However, the salience of impacts on wildlife in the survey responses, as well as the number of public campaigns currently underway concerning protection of the marine environment, show that public concern is not solely driven by self-interest.

Most other studies exploring public attitudes towards climate change impacts on marine environments are concerned with perceptions of risk from sea level rise and associated coastal flooding. Curiously, they indicate that relatively few people regard themselves as being personally at risk from coastal flooding, even if they live in vulnerable locations. While sea level rise, coastal flooding, erosion and harm to wildlife have visibility and immediacy for the public, some other marine climate change impacts do not. In particular, ocean acidification tends to be seen as a remote, highly scientific issue without relevance to people's lives.

Engaging the public
Globally and in Europe there is a sense that scientifically defined climate change impacts are remote in space and time and often lack relevance to peoples' own daily lives. Recent controversies over climate science and competing issues such as the economic recession can make it harder for scientists to get their messages across. The problem is compounded when journalists use alarmist and shocking images and stories in an effort to capture public attention. In fact, the evidence shows that these tend to be counter-productive, because they prompt psychological 'denial'. Instead, messages that combine authoritative scientific information about climate change impacts on local scales with simple advice on how citizens can respond seem to be more effective in promoting interest and practical responses. Any attempts at involvement should start from an understanding of how the public understand, experience and engage with marine climate change issues in their own terms.

‘TESTING THE WATER’ – RAISING AWARENESS OF OUR CHANGING SEAS

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CLAMER started with the observation that the results from many climate change research projects are often disseminated only to a select public. More, in an outreach analysis of 64 EU and national research projects focussing on marine climate change issues by CEFAS, it has been found that most of this outreach did not extend beyond one-way imparting of knowledge through project websites, brochures, scientific papers or conferences, with little or no attempt to involve members of the public and stakeholders directly or gather views and opinions. Therefore, one of the main objectives of CLAMER was to valorise European research efforts into the effects of climate change on marine ecosystems, and to try to close part of the gap between public perceptions and the scientists’ expanding knowledge.

In this presentation a short overview will be presented of the various outreach activities and deliverables that have been prepared and worked out within the CLAMER project:

- a 58’ documentary on the science and public perception of marine climate change in Europe (ComOnPlanet & Océanopolis);
- a 56 page booklet on marine climate change in Europe (SAHFOS);
- 12 original and unique ‘all-in’ illustrations on marine climate change (Glynn Gorick);
- side-events and a communication campaign including a video-contest in 34 European aquaria and marine institutes (VLIZ);
- a portal with fact sheets, science & policy synthesis reports, inventories of EU research & outreach projects on marine climate change (VLIZ);
- an international media-action (Terry Collins).

SESSION 3

How to shape future marine climate research and outreach in Europe

SCIENCE FOR SOCIETY: LINKING MARINE AND CLIMATE CHANGE RESEARCH WITH POLICY

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Because of their potential serious impacts on ecosystems, societies and economies, climate change in the marine environment and ocean acidification have to be taken into account in, and across, a whole array of policy fields: environment, climate, energy, tourism, fisheries, infrastructures, transport, industry, …

High quality research is necessary to support decision making in all these fields, yet it is not sufficient. There is a need for well-functioning interfaces between science and policy which allow for two-way flows of knowledge between the research and the policy worlds.

As an introduction to the afternoon workshop discussions, this presentation will address the strategic importance of marine ecosystems and climate change research for Europe. It will then explore why and how to interface this research with policy processes. Roles and responsibilities of different actors will be discussed.

Interfaces between science and society are equally crucial, as will be discussed by Mr. Cooper in the other introductory presentation.

ALL ABOARD: GETTING CLIMATE CHANGE RESEARCH TO CHIME WITH THE WIDER PUBLIC

Quentin Cooper

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A personal overview of some of the successes and failures of communicating both climate change research and the broader issues around our changing climate through conventional media and other routes. Many climate change research projects struggle to get accurate and wide-reaching coverage of their results, sometimes sacrificing in order to achieve the other. Media short-sightedness, a failure to frame findings in ways that are easily comprehensible to non-specialists, and a sense that the public have had their fill of climate change stories are all factors in this.

In this presentation the focus will be on positive examples with particular emphasis on the ongoing Cape Farewell project.

WORKSHOPS

Climate change impacts and European marine policies
Moderators:
Jason Chilvers, Stefan Gelcich, John Pinnegar

Understanding public understanding: the implications of CLAMER public perception findings for marine scientists and policy makers
Moderators:
Jan-Bart Calewaert, Niall McDonough, Sybille van den Hove

Organisation of the European marine climate research community and agendas in the future
Moderators:
Carlo Heip, Jan Mees, Katja Philippart